

REMARKS

Claims 1 through 23 are in the application and are presented for consideration. By this amendment, Applicant has made minor clarifying changes to independent claims 1 and 16. Claim 15 has been amended to highlight structural features of the friction welding provided by the pressure welding machines. New claim 19 highlights the method features for friction welding including the structure of the rotary drives for such friction welding. New claims 20 highlights the method features for welding with a magnetically moved arc including providing related structure. The structure for the rotary drive of the welding heads for friction welding is highlighted in new claim 21. New claim 22 is similar to claim 1 but is more particular with regard to the relationship between the various structural parts. New claim 23 highlights the structure relating to the various movable welding heads and adjusting units and the relationship between the common adjusting element and the movable adjusting units.

Claims 16 has been objected to because of informalities. Further claims 14 and 16 have been rejected as being indefinite under 35 U.S.C. 112, second paragraph. The claims have now been revised paying close attention to the Examiner's comments and to address these issues. Applicant wishes to thank the Examiner for the careful reading the claims and for the helpful comments.

Claims 1 through 6, 8 through 9 and 15 have been rejected under 35 U.S.C. 102 (b) as being anticipated by Penman (US 4,733,814). The rejection is based on the position that Penman discloses each of the features as specified in the claims. However, there are significant differences between the invention and the construction and function of the friction

welding machine in the prior-art reference.

Penman discloses "heads" (18) that may be said to correspond to the "welding heads" (13, 14) in the present invention. The "hydraulic piston and cylinder arrangement" (21) in Penman corresponds to the "adjusting unit" (17, 18) and the "feed drive" (23) in the present invention. These "adjusting units" are used to move the "welding heads" in the axial direction of the common axis (17) in Penman. In particular, these apply suitable welding pressures to the holders 20 to complete the welding process (column 4, lines 1 – 3). For friction welding, the holders 20 are rotated by an arrangement including lay shaft 22.

The "adjusting units" (21) are each arranged according to Penman on a carriage (11, 12), which can slide with its base (13) on a machine bed (10) in the axial direction. According to column 3, lines 36 through 55, the "carriage assemblies" (11, 12) which include the respective "adjusting units" (21) according to Penman are not connected to one another. Each carriage assembly is fixed individually and independently on the machine bed with a mechanism and with a "braking element" by frictional engagement on the machine bed. This is also indicated by the description in column 2, line 61 through column 3, line 9.

Thus, Penman does not show a "common adjusting element" for an "adjusting drive," with which "adjusting units" (21) are connected to one another and can be positioned and adjusted. Penman rather teaches the opposite and provides the full separation of the "adjusting units" (21) and the independence thereof from one another.

This is also linked with the circumstance that the "adjusting units" (21) are each arranged and mounted on their "carriage" (11, 12). The "carriages" (11, 12) are fixed in

relation to the machine bed (10) via their bases (13). Thus, there is no possibility of connecting the "adjusting units" (21) to one another according to Penman.

The "lay shaft" (22) in Penman does not provide a connecting function with respect to the two separate and independent adjusting units 21. Even if it is considered that adjusting unit 21 is in contact with holder 20 which is in contact with your train 24, which is in contact with lay shaft 22, which is in contact with a gear train that is in contact with a holder that is in turn in contact with another adjusting unit, this is certainly not a connection for adjustment as there is no adjustment of the adjusting units via a common adjusting element with an adjusting drive. Further this is not a connection of a common adjusting element to each of the two adjusting units. Most importantly, Penman fails to teach and fails to suggest a common adjusting element which supports each of the two adjusting units. There is clearly no support provided to the adjusting unit 21 by the lay shaft 22 according to Penman.

The lay shaft 22 is merely a common rotary drive for rotating the "workpiece holder" (20). It appears that this is the structure which provides the rotation for friction welding. In this regard, it is noted that claims 15 and 20 are clearly not anticipated by Penman as these further require rotational drives for the welding heads. According to these claims, there is both a rotary drive as well as the common adjusting element with adjusting drive for positioning the adjusting units and supporting the adjusting units. Such a combination of features is clearly neither taught or suggested by Penman.

Further, as noted above, the basic combination of the independent claims is not anticipated by Penman. The "lay shaft" (22) is connected via a "ball spline" to the two "gear

trains" (24), which establish the rotary driving connection between the rotating "holder" (20) and the "lay shaft" (22). The "ball spline" makes it possible for the "gear trains" (24) to move axially along the common "lay shaft" (22) during the axial feed of the "holder" (20). The "lay shaft" (22) and the "gear trains" (24) are only connected to the "holder" (20) according to Penman and drive this rotatingly. However, there is no connection between the "lay shaft" (22) and the "adjusting units" (21). The "lay shaft" (22) according to Penman is not an "adjusting drive" for positioning and adjusting the position of the adjusting units as according to the present invention. Also, there is no adjusting drive with a common "adjusting element." Penman rather teaches the opposite of the present invention and of claim 1. What Penman wants is only to synchronize the "lay shaft" (22) with the rotary motions of the two "holders" (20). Accordingly, the combination of features as specified in the claims is not anticipated by Penman. Further, the combination of features patentably defines over the prior art.

Claims 16 and 17 have been rejected under 35 U.S.C. section 103 (a) as being obvious based on the teachings of US 4,733,814 A (Penman) in view of US 4,414,046 A (Palmer).

As discussed above the "adjusting units" are not connected to one another according to Penman. There is no adjusting drive for driving a common adjusting element for positioning each of said two adjusting units. Further, there is no use of a common adjusting element to provide support to the adjusting units. In claim 16 these features are also mentioned and the claim also requires "mutually supporting said adjusting units in an adjustable manner while absorbing the pressure welding forces in a close system of forces." Palmer is said to show the missing features. However, Palmer also teaches a common "lay shaft" (21) that is likewise

used according to Palmer only to synchronize the rotary motions of the "chucks" (17) via gear mechanisms (16) (column 2, lines 25 through 34). Palmer also fails to show any "adjusting units," because it is disclosed in the same passage in column 2 that the two housings (12) are fixed at the end on the machine bed (11). It is only disclosed in column 2, lines 42 through 48 that the workpiece components (18) are brought into mutual contact with the ends of the central pipe (10) with an axial motion by means which are not shown.

The references fail to teach and fails to suggest "mutually supported adjusting units." This critical feature of the invention is absent from the two prior-art references. There also is no "closed system for absorbing the pressure welding forces." Penman and Palmer fail to provide teachings which render the claimed subject matter obvious. Accordingly, reconsideration of the rejections is requested. Further, the adjusting drive for driving said common adjusting element for positioning each of said two adjusting units is also now further highlighted in claim 16. The claimed process patentably defines over the prior art as a whole. The significant structural combination process features of the invention differs from the prior art as a whole. Although it is not meaningful per se, this contribution of the invention and differentiation from the prior art has been indicated by European Patent Office which has granted a patent with these independent claims 1 and 16 as originally presented.

Claims 7 and 10 have been rejected under 35 U.S.C. 103 (a) as being obvious based on Penman in view of Gage (US 3, 516, 591).

Applicant requests reconsideration of this rejection. For the reasons noted above, the invention provides the combination of features which is different from the prior art. Applicant

as noted the position as to the "adjusting units" not being connected to one another according to Penman and further pointed out that according to the prior art including Penman there is no adjusting drive for driving a common adjusting element for positioning each of said two adjusting units. Most importantly, the prior art including Penman does not teach and does not suggest a common adjusting element to provide support to the adjusting units. Claim 7 further highlights this feature with carriages and carriage guides cooperating with a central workpiece. The entire approach is different from the prior art. The difference also is important with regard to the subject matter claim 10. Accordingly, reconsideration of the rejections is requested.

In addition to the arguments made above with regard to important differences between the claimed structure of the invention and the prior art as well as important differences between the claimed process and the prior art, the structure is further differentiated by each of claims 15 in 19. As pointed out above, with regard to claim 15, the structure associated with lay shaft 22 of Penman is to provide rotation of the holders. As such, Penman does not disclose a rotary drive for the workpiece (3, 4) in relation to the central workpiece (2) for friction welding as well as the structure relating to the common adjusting element. The combination of features are highlighted in process claim 19. New claim 20 highlights the combination of process features of claim 1 including process features for welding with a magnetically moved arc. The prior art fails to teach and fails to suggest this combination. Claim 21 further highlights the important structural combination not suggested by any the references. A machine and a process for welding with a magnetically moved arc is not disclosed in the prior-art references cited

Applicant respectfully requests that the Examiner reconsidered the outstanding rejections. It is Applicant's position that the claims highlight important combination of features. The combination of features is neither taught or suggested by the prior art. The prior art clearly directs the person ordinary skill in the art toward different structural features, particularly the provision of a synchronized drive for rotation of the workpieces. The invention provides structure which is different from that proposed by the prior art. Further, the structure and process according to the claims is not obvious in view the prior art.

Further and favorable consideration on the merits is requested.

Respectfully submitted
for Applicant,



By: _____
John James McGlew
Registration No. 31,903
McGLEW AND TUTTLE, P.C.

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SHOULD ANY OTHER FEE BE REQUIRED, THE PATENT AND TRADEMARK OFFICE IS HEREBY REQUESTED TO CHARGE SUCH FEE TO OUR DEPOSIT ACCOUNT 13-0410.

DATED: August 14, 2009
McGLEW AND TUTTLE, P.C.
BOX 9227 SCARBOROUGH STATION
SCARBOROUGH, NEW YORK 10510-9227
TELEPHONE: (914) 941-5600
FACSIMILE: (914) 941-5855